UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

ORACLE AMERICA, INC. Plaintiff, v. GOOGLE INC. Defendant.	Case No. CV 10-03561 WHA

OPENING EXPERT REPORT OF JOHN C. MITCHELL REGARDING PATENT INFRINGEMENT

SUBMITTED ON BEHALF OF PLAINTIFF ORACLE AMERICA, INC.

CONFIDENTIAL PURSUANT TO PROTECTIVE ORDER
Highly Confidential – Attorneys Eyes Only

pa-1460906

suck." The email clearly indicates that Google's founders, no less, asked for a comprehensive search for non-infringing alternatives in order to establish a credible bargaining position. The email states that Google examined the alternatives, and concluded that no suitable alternatives exist.

111. Once Google's decision was made to use Java, the discussion above shows the criticality of the claimed inventions of the patents-in-suit and the unacceptable performance consequences of eliminating them from the Android platform. As further described below for each patent, Dan Bornstein, Google's 30(b)(6) designee on non-infringing alternatives, was again unable to provide acceptable non-infringing alternatives that could provide similar performance or security.

112. ***No reasonable non-infringing alternative to the '104 patent***: The '104 patent provides a means to store numeric references produced by resolving symbolic references and reuse them in future executions of the corresponding instructions. This invention provides a dramatic performance improvement because symbolic name resolution typically requires considerable computation time, whereas using stored numeric references is much faster.

113. I am not aware of a reasonable non-infringing alternative to the '104 patent suitable to the Android execution platform and that would be comparable in speed to determining, storing, and reusing numeric references, as claimed in the '104 patent. Android could be made not to infringe by disabling the infringing mechanism and repeating symbolic resolution each time the bytecode interpreter encounters a symbolic reference. But if that were done, Android would suffer a substantial performance degradation as determined in the performance testing conducted by Oracle Java engineer Bob Vandette at my direction, which was based on a modified Android system that did not store the results of symbolic reference resolution. (In Android, symbolic reference resolution may be performed by either dexopt or the Dalvik VM; the analysis disabled both.) The analysis determined that the use of the '104 patent in Android improves performance by a factor of thirteen.

with Android. From the testimony and documents I have reviewed, I conclude that, with respect to the technology that infringes the asserted patents, Google is responsible for how downstream users' Android devices function and Google does know (or could know) what changes major manufacturers do or do not make to the infringing functionality in Android. I have not seen any evidence that Google has made changes to Android as a result of learning of the patents-in-suit and Oracle's infringement contentions.

186. Google takes many steps to ensure compatibility among competing Android products and avoid fragmentation of the Android platform. Google has a financial and technical interest in ensuring Android applications can run on any Android device, regardless of who manufactured it.

187. According to Google engineer Dan Morrill, Google makes "compatibility a strict prerequisite for access to Android Market and the right to use the Android name." (http://android-developers.blogspot.com/2010/05/on-android-compatibility.html (last visited Aug. 8, 2011).) Although Android source code is open source and in theory OEMs are free to modify Android as they please, in practice they are not because of Google's compatibility requirements. Google does not permit Android devices to be branded as "Android" devices, have access to the Android Market, or include Google applications unless the devices comply with the Compatibility Definition Document (CDD), which "defines in gory detail exactly what is expected of Android devices." (http://android-developers.blogspot.com/2010/05/on-android-compatibility.html (last visited Aug. 8, 2011); *see also* http://source.android.com/faqs.html (last visited Aug. 8, 2011); GOOGLE-17-00119695 at 695; GOOGLE-17-00016798 at 798.) From this one can conclude that if a device is branded "Android," then it operates as it would if it were running stock Android from Google, at least with respect to the infringing functionality that I have identified.

188. In order to promote compatibility and help device manufacturers satisfy the CDD, Google provides its Compatibility Test Suite (CTS), which is a collection of test cases that checks the performance of Android devices and for compliance with the required functional

behaviors. (*See* http://source.android.com/compatibility/cts-intro.html (last visited Aug. 8, 2011).) The test cases check for correct functioning of the Dalvik virtual machine, the Android application framework, the Java core libraries (including the java.security code), and so on. (*See* http://static.googleusercontent.com/external_content/untrusted_dlcp/source.android.com/en/us/compatibility/android-cts-manual-r4.pdf (last visited Aug. 8, 2011).) In my experience, smartphone manufacturers that were making substantial investments in their product lines would not want to make changes to Google's code at the framework level or below, which would risk incompatibility that could be very difficult to discover, unless there was a very compelling reason. If there were such a reason, such as a critical bug fix or a substantial performance improvement, I would expect that Google offers incentives for contributing those changes upstream, where they would become part of the next Android version. I am not aware of any changes that any smartphone manufacturer has made to Android that affected the functionality that infringes the patents-in-suit, as I describe below.

189. Manufacturers would be much more likely (in fact they all do) to make changes or additions to the Android UI or applications for their smartphones, because these changes can be used to differentiate from other manufacturers' products without risk of breaking the operating system. (7/12/2011 Morrill Dep. 142:19-143:24.) Changes to these portions of Android would not affect my infringement analysis.

190. Other than fixing bugs, I would not expect there to be any benefit for device manufacturers to change the source code for low-level, internal Android code, such as Dalvik, the .dex file optimizer, the application framework, and zygote. Much of the Android code is very complex, and because Google has already provided a functioning system that will pass the CTS, there is little to be gained from altering most of it. According to Dan Morrill, "Android is not a specification, or a distribution in the traditional Linux sense. It's not a collection of replaceable components. Android is a chunk of software that you port to a device. For the most part, Android devices are running the same code." (http://android-developers.blogspot.com/2010/05/on-android-compatibility.html (last visited Aug. 8, 2011); *see*

XIII. CONCLUSION

767. For the foregoing reasons, it is my opinion that Android infringes:

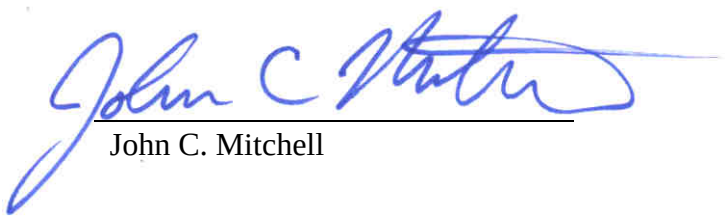
- Claims 11, 12, 15, 17, 22, 27, 29, 38, 39, 40, and 41 of United States Patent No. RE38,104;
- Claims 1, 2, 3, and 8 of United States Patent No. 6,910,205;
- Claims 1, 6, 7, 12, 13, 15, and 16 of United States Patent No. 5,966,702;
- Claims 1, 4, 8, 12, 14, and 20 of United States Patent No. 6,061,520;
- Claims 1, 4, 6, 10, 13, 19, 21, and 22 of United States Patent No. 7,426,720;
- Claims 10 and 11 of United States Patent No. 6,125,447; and
- Claims 13, 14, and 15 of United States Patent No. 6,192,476

It is also my opinion that Google is liable for direct and indirect infringement in the manner described above.

768. For the forgoing reasons, it is my opinion that the patents-in-suit form the basis for consumer demand for Android by developers and end-users.

769. For the forgoing reasons, it is my opinion that once Google decided to adopt the Java execution model in Android, the patents-in-suit became necessary to Android achieving satisfactory performance and security.

Dated: August 8, 2011



John C. Mitchell